Appendix A5-C. Sample-designation codes and a summary of field-processing requirements for analyses of stable isotopes and radiochemicals in water

[NWQL, National Water Quality Laboratory of the U.S. Geological Survey; L, liter; LC, laboratory code; DIC, dissolved inorganic carbon; mL, milliliters; $HgCl_2$, mercuric chloride; °C, degrees Celsius; HNO_3, nitric acid; <, less than; TDS, total dissolved solids]

Stable isotopes and radiochemicals[1]	Size and type of sample container[2]	Sample-designation codes of NWQL[1]	Treatment and preservation[3]
$^{13}C/^{12}C$	1-L glass bottle, narrow neck, with Teflon™/silicon septum. **Field rinse**.	RUS LC440	Raw sample, untreated. Contact laboratory for $^{13}C/^{12}C$ and $^{18}O/^{16}O$ combined sample (LC1243). Fill bottle to overflowing.
^{14}C	Safety-coated or glass bottles with Teflon™/silicon septum. **Field rinse**. Secure cap with electrical tape. Bottle size depends on sample pH and concentration of DIC per volume of sample.	RUS/RUR	Raw or filtered sample—Filter samples with visible particulates; untreated. Fill bottle to overflowing. Exclude air and (or) flush headspace with nitrogen gas. Store chilled and in the dark. Contact NWQL.
$^{2}H/^{1}H$	60 mL clear glass bottle. Leave small headspace. Option: 250 mL polyethylene, no headspace. Use caps with polyseal conical inserts. Do not use plastic bottles if sample will be held or archived. **No field rinse.**	RUS, LC1574 or SH1142 if analyzing together with $^{18}O/^{16}O$.	Raw or filtered sample, untreated. Fill bottle to overflowing; then decant to leave a slight headspace. (Can be collected with $^{18}O/^{16}O$.)
$^{18}O/^{16}O$	Same as $^{2}H/^{1}H$ (LC1574) No field rinse.	RUS, LC0489 or SH1142 if analyzing together with $^{2}H/^{1}H$.	Filtered or unfiltered sample, untreated. Fill bottle to overflowing.

Appendix A5-C. Sample-designation codes and a summary of field-processing requirements for analyses of stable isotopes and radiochemicals in water —*Continued*

Stable isotopes and radio-chemicals[1]	Size and type of sample container[2]	Sample-designation codes of NWQL[1]	Treatment and preservation[3]
$^{15}N/^{14}N$	1-L amber glass bottle or high-density polyethylene (HDP) bottle. Use caps with poly-seal conical inserts. **No field rinse.**	RUS, LC1717 (ammonia), LC1718 (as nitrate), or LC1921 (as nitrate plus ammonia)	Filtered sample, untreated. Fill bottle to shoulder. Wrap HDP bottle in aluminum foil. (Do not add $HgCl_2$.) Chill/ maintain at 4 °C. **Send overnight to NWQL.**
$^{34}S/^{32}S$	[Refer to Carmody and others (1998) or E-mail **isotopes@usgs.gov**.]	RUS, Add appropriate laboratory code.	[Refer to Carmody and others (1998) or E-mail isotopes@usgs.gov.]
Radium 226	2-L polyethylene bottle, acid rinsed. (Check with laboratory.) **No field rinse.**	FAR, LC794	Filtered sample. Fill bottle to shoulder. Add HNO_3 to pH <2.
Radium 228	2-L or 7-L polyethylene bottle (check laboratory requirements), acid rinsed. **No field rinse.**	FAR, LC1364	Filtered sample. Fill bottle to shoulder. Add HNO_3 to pH <2.
Uranium U-234 U-235 U-238	Two 1-L polyethylene bottles, acid rinsed. **No field rinse.**	FAR, SH1130	Filtered sample. Fill bottle to shoulder. Add HNO_3 to pH <2.
Gross radio-activity (Gross alpha and gross beta)	1-L polyethylene bottle(s), acid rinsed. **No field rinse.**	FAR, SH456 or SH458, depending on TDS	Filtered sample. Fill bottle to shoulder. Add HNO_3 to pH <2.

Appendix A5-C. Sample-designation codes and a summary of field-processing requirements for analyses of stable isotopes and radiochemicals in water —*Continued*

Stable isotopes and radio-chemicals[1]	Size and type of sample container[2]	Sample-designation codes of NWQL[1]	Treatment and preservation[3]
Tritium[1]	High-density, nonbreakable, polyethylene (HDPE) or 1-L glass GCC bottle. **No field rinse.**	RUR	Raw sample, untreated. Leave slight headspace. Do not store sample near radium (for example, glowing clocks, watches, signs)
Radon-222	Glass vial containing liquid-scintillation solution. **No field rinse.**	RUR-SV	Raw sample. Inject 10 mL of sample below liquid-scintillation solution.

[1]This table is not complete or comprehensive. Check with NWQL for the most current information on analytical schedules, laboratory codes, parameter codes, sample requirements, prices, and associated information. "G" indicates glass container; "CC" indicates chilled sample; "LC", laboratory code; "SH," laboratory schedule; "R" designates a raw or wholewater sample. For tritium/helium-3 and chlorofluorocarbon sampling requirements, see sections 5.6.3.J and 5.6.3.K, respectively.

[2]If glass bottles are used, leave enough air space in bottles to accommodate expansion of chilled samples unless instructed otherwise. Seal cap with wax or plastic tape, or as directed by laboratory. Send electronic mail requests to isotopes@usgs.gov. Container size is subject to sample-volume and analytical-method requirements. Acid-rinsed bottles must be received from the laboratory capped. Do not use acid-rinsed bottles that arrive uncapped.

[3]Procedures for collection and processing of isotope and radiochemical samples are also described in Shelton and others (1994), Koterba and others (1995), and Timme (l995).